South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde
P.O. Box 643, Cape Town Posbus 643, Kaapstad

Cape Town, 2 April 1955 Weekly 2s. 6d. | Vol. 29 No. 14 | Kaapstad, 2 April 1955 Weekliks 2s. 6d.

EMPLOYMENT, PENSIONS, COMPENSATION AND REHABILITATION IN SOUTH AFRICA

SOME SOCIAL AND MEDICAL ASPECTS AND ATTITUDES

JOHN SAVILLE LEWIS, M.B., CH.B., D.P.H.
Deputy Medical Officer of Health, Springs

The articles on rehabilitation that appeared in this *Journal* of 21 August 1954 (**28**: pp. 701—733) were both timely and welcome.

The first object of rehabilitation should be to return the temporarily or permanently disabled patient to remunerative productive work in the shortest possible time. Recovery during convalescence is not dependent on the prolonged rest which has too often been medical doctrine in the past. In tuberculosis[6] I have time and again witnessed the social, moral and physical benefits that result from reasonably early activity. The lively, naughty, undisciplined patient, determined to return to his place in society at the earliest opportunity, has, in spite of our forecasts, often shown the best recovery.

The community pays dearly in loss of working hours for unemployment due to disability. That the economic loss can be offset by the labour of patients in hospital is at present being demonstrated in the tuberculosis 'settlements' of the South African National Tuberculosis Association.[6] A still better example of socio-economic advantage is the chronic sufferer from open tuberculosis who finds employment[4] that does not require him to come into intimate contact with his fellows. The risk of occasional infection is more than offset by the greater readiness with which hitherto concealed cases come forward when they see that their activities will not always be held in restriction.

The more successful we are with the medical and surgical treatment of disease, the earlier it behoves us to rehabilitate our patients; and failure to cure is no reason for denying healthful and gainful occupation suitable to the disability. To this end financial help ought to be made available in disability and maintenance-grant scales that give encouragement to gainful employment. At present some men prefer to depend on disability grants until they can qualify for the old age pension. Old age itself, however, is not *per se* a good reason for inactivity.

In the interests of the disabled employee more consideration ought to be given to the diversion if necessary of some of his compensation funds to subsidize his employment in suitable posts while his work output is reduced. An alternative might be to make it obligatory on State, Municipal and private employers to employ these men in certain proportion to their total labour force or in special reserved occupations.

THE PLACE OF MEDICINE IN COMMERCE AND INDUSTRY

In industry and commerce the primary function of the medical profession is the diagnosis and treatment of disease and the giving of advice to the worker and his family. This ought not to be allowed to hamper our entry into the wider social field as advisers on the conservation and enhancement of man-power potential. In any industry intelligent observation over a period of time will reveal many of the social and medical factors that affect its man-power, such as special physical and chemical hazards and causes of accidents (e.g. excessive overtime and fatigue), local social causes of absenteeism (e.g. rugby matches or the sardine fishing season), maladjustment of home life, alcoholism, dietary habits and ignorance, environmental hygiene, housing, recreation. The pursuance of these studies will call for close liaison and co-operation with fellow workers in other professions and sciences; and will result in benefit not only to industry and commerce and the whole national economy but also to the employees and their families.

PENSIONS

The raising of the pensionable age would not necessarily help the employee who has earned the privilege of a

pension at an age at which he can live to enjoy it; nevertheless, the employment of pensioners on a basis acceptable to their co-workers is desirable.

During recent years pension funds have been subject to a continuous devaluation of the original contributions.[7] Moreover, many of them are a handicap to the employee who, having gained experience and qualifications, has the initiative and desire to improve his position by changing his employer. The terms of most pension funds are such that the employee who changes his employer not only forfeits his pension rights but may lose some of the accumulated interest on his contributions! To secure his pension benefit the employee (in some cases) must be prepared to 'rot in his job and be tied as a slave to his master'. There are advantages in a stable labour force, but free movement of workers with improvement of knowledge and technique is also desirable.

In my opinion pension funds would morally be more justifiable if the worker were entitled to contribute to them for the whole of his working or professional life, independently of what employer he was working for. Employers might still contribute to their employees' pension funds.

For pension purposes actuarial formulae can be devised to cover all illness risks, even those illnesses which are known to be progressive in the sense that they will shorten the normal span of working life. The higher the risk the higher the premium; but if the partially disabled were included in the country's labour force we should be able to buffer to some extent the earlier age of pension grants in some instances.

WORKMEN'S HAZARDS AND COMPENSATION

The special hazards of industry are not always apparent at the outset and for this reason it is advisable for new ventures to enlist the services of factory medical officers to undertake complete medical recording of the physical and mental state of the employee both before and during the course of employment. When later it is mooted that the industry has a causal relation to disease the problem can be much more effectively investigated if these data are available.

If a nurse contracts tuberculosis indefinite argument may arise between hospitals as to the probable source and time of the infection if she has not been subject to periodical X-ray examination of the chest. An emphysematous employee working among fumes and dust will soon complain; the lack of an efficient initial examination and regular re-examination of his medical condition may result in an unnecessarily disgruntled employee or an unjustified claim for damages.

Cases like these require the utmost tact and skill in handling and occupational placement. The task is to place as many of the partially disabled in employment as possible without undue prejudice to the employment of healthy people. Success is obviously dependent on the co-operation that can be engendered among management and staff and on the social and economic conditions of the time.

Referring to the Workmen's Compensation Act Dr. Lomey remarks, 'The keystone should be rehabilitation', and in discussing the Silicosis Act Dr. F. S. du Toit mentions 'the psychological outlook common to many industrial workers, namely to get more and more for less and less.'[2] Much good constructive initiative is contained in both these Acts. What improvement is needed? The answer is that in these Acts the accent on compensation should be transferred to rehabilitation both in the letter of the Acts and the spirit of those who are professionally concerned in their administration.

SOME SPECIAL PROBLEMS IN MINING PRACTICE

The Silicosis Act unfortunately laid more stress on compensation for silicosis and tuberculosis than on disability among miners irrespective of the cause. The miner suffering from dyspnoea due to primary cardiac failure who applied for compensation was just as much in need of help as his silicotic workmate. He was dismayed to see the latter receive compensation for silicosis, often without disability, while he was refused. This defect in the social approach led to a commission of enquiry and subsequently the Silicosis Amendment Act of 1952.

This Act attempts to accommodate in the new concept of 'pulmonary disability,'[5] some of these disabled miners in whom the aetiological basis of their condition was not clear or not clearly proven. Surely it would have been better to recognize the trend towards Social Security and to have included 'cardiac disability' among the conditions which entitle the miner to assistance! This would have placed the emphasis on the existence of disability rather than on the unhappy differential diagnosis of the cause.

In South Africa gold mining still has pride of place amongst industries. For full-time underground work it recruits after the initial examination conducted, for Europeans, by the Silicosis Medical Bureau and, for non-Europeans, by the Witwatersrand Native Labour Association and Recruiting Agencies, and accepts only the cream of our labour force. This is done in an attempt to ensure the employment of a miner who can withstand the special hazards of tuberculosis and silicosis as well as the rigours of deep-level mining, viz. heat and humidity of atmosphere. Europeans with physical or pulmonary defects of note are rejected. Exceptions are made for those applying for restricted tickets entitling them to undertake part-time underground employment, e.g. electricians and other artisans. The full-time miner's red ticket is thus a prized key not only to mining employment, but to the outside business employer who is shrewd enough to recognize its value.

This selection of our man-power for scheduled mines naturally has a profound effect on our social structure.[3] The asthenic ectomorphs, the endomorphic and other physically disabled who are rejected, must needs, if they are miners by trade or wish to become miners, take to work in those non-scheduled mines (e.g. coal, asbestos, chrome, gold) which do not require such a strict initial examination. These are open or closed non-scheduled mines which are not yet proven silicosis or pneumokoniosis hazards. Their working conditions may in reality be far worse than those of our well conducted gold mines, where miners are relatively well protected. In South Africa time brings many mines into the

scheduled list as the pneumokoniosis dust hazard is proved. The Protectorates and Rhodesias do not have identical legislation or medical standards. In industry other than mining there are processes (e.g. sand-blasting, grindstone, abrasive-powder and blasting work) which also provide pneumokoniosis hazards.

The miner's special disability is dyspnoea on exertion. Paradoxically the more we examine a man for silicosis the more aware we make him of this hazard, and as the years of exposure to silicosis pile up the more fearful he becomes. A shortness-of-breath neurosis with increased anxiety to leave underground employment is added to our symptom complex. As many miners lack the necessary scholastic and vocational background to undertake non-manual duties satisfactorily, it is not easy to place the disabled in sedentary work. Without employment, however, there is much distress in the stoep-watching activities of these ex-miners even when on pension.

A constant aim of our mining population is naturally to graduate to surface work. To this end many a miner lives for the day when he can obtain sufficient capital (e.g. from his Provident Fund) to venture into business, under-capitalized farming or other employment. Sometimes he does so very successfully; but too often, lacking good health and proper guidance or experience, he meets economic disaster and returns to the mines for a living. Thus there is a flow of mining labour to and from private enterprise. This constant drift reduces the average period of exposure to silicosis.

Thus in evaluating the decreased incidence of silicosis in recent years we should not think only in terms of reduction of dust concentrations, changing standards in the selection of recruits and changes in mining processes, but should take into account the over-all spread of risk and the social trends of the time.[3]

CONCLUSION

Man-power selection serves a very useful purpose in securing efficient work, but it becomes an abuse, detrimental to the national interest, when coupled with compulsory pension-fund membership and medical examinations designed to exclude the physically and medically unfit from employment. Pensions do not provide adequate security justifying complacency.[7] Was it not Professor Joad who said there was no such thing as social security? Can we, in the face of the cyclical economic factors that produce unemployment, profitably afford to employ misfits, the disabled or old-age pensioners? Should we on the other hand be complacent about losing any part of our productive labour potential, which in the end determines the standard of living for all?

What is needed is a bold scheme of employment to embrace all these misfits and living deterrents to hazardous enterprise by inculcating a new and more pleasant approach acceptable to the disabled. In a spirit of optimism we should be undeterred by the intricate social surveys that are needed and the delicate interpretation that is required to supply a suitable and perhaps new approach to the complex social problems that stand before us.

To industry and legislators let us say: 'In your approach to compensation for special industrial hazards, by all means compensate for the specific disability but do not overlook the social need of the disabled for rehabilitation and employment. Compensation and pensions for disability and old age are in themselves insufficient for our social well being'.

REFERENCES

1. Lomey, A. L. (1954): S. Afr. Med. J., **28**, 713.
2. du Toit, F. S. (1954): *Ibid.*, **28**, 847.
3. Verster, A. W. S. (1954): *Ibid.*, **28**, 841.
4. Dormer, B. A. (1954): S. Afr. Nat. Tuberc. Assoc. J., May.
5. *Silicosis Legislation 'in muddle'*. Rand Daily Mail, 23 October 1954.
6. Lewis, J. S. (1953): S. Afr. Med. J., **27**, 980.
7. Holloway, J. E. (1954): Municipal Affairs, **20**, 21.

NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

Modern Water Treatment. Laboratory and Experimental Filters. Berkefeld Filters and Water Softeners Ltd. (Sardinia House, Kingsway, London) are manufacturers of water treatment and filtration equipment, chemical and industrial, including the well-known laboratory and experimental filters.

Essentially, the filtering medium of the 'Berkefeld' filters is in the form of hollow candles of various sizes made of Kieselguhr, which on account of its enormous porosity, is an ideal filtering medium. The candles are completely closed at one end, and the other end is fitted into a metal or porcelain mount. The water passes through the walls from outside to the inside, leaving all impurities on the external surface, and then out through the small aperture of the mount.

One of the firm's latest developments is a self-sterilizing candle, the 'Sterasyl'. It is well known that with the standard filter candles frequent boiling is essential if the germicidal qualities are to be maintained. The new candle not only acts as an efficient filter, but is designed to sterilize as it filters. Germs are both trapped and destroyed on the exterior surface of the candle. The candles will last for a long time without renewal, and for cleaning purposes all that is necessary is to wash them occasionally with a soft brush in clean water, no soap or detergent being required. The 'Sterasyl' germicidal effect is attributed to an ionic process, not fully understood.

For laboratory purposes filters are available for sterilizing liquids, and they are especially suitable for those containing bacteria. They yield a clear sterile blood-serum, and from fresh milk give a perfectly clean colourless milk-serum free from fat. These laboratory filters are available in 4 sizes, with capacities of 100, 200, 250 and 750 c.c. respectively; the length of the candles is 4, 8, 10½ and 11 inches, and the diameters 1¼, 1½, 1½ and 2¾ inches.

Equally interesting are the large-supply pressure filters suitable for all purposes where a constant supply of pure water is required. A wide range is available according to the number of candles, and these are suitable for use where the main pressure is 35-45 lb. per square inch. If the pressure exceeds 45 lb., a pressure-reducing valve should be inserted, as excess pressure only impedes easy cleaning and shortens the life of the filter candles.

South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde

VAN DIE REDAKSIE

DIE VORMING VAN ROOI BLOEDLIGGAAMPIES

William B. Castle, bekend vir sy oorspronklike werk oor die ‚*intrinsic factor—extrinsic factor*' met betrekking tot kwaadaardige bloedarmoede, het onlangs ons huidige kennis van eritropoïese[1] in oorsig geneem.

Die vorming van rooi bloedliggaampies behels in hoofsaak die vervaardiging en verpakking van hemoglobien, maar die verskil in rooi bloedliggaampies tydens verskillende patologiese toestande dui aan dat die produksie van rooi bloedliggaampies en hemoglobien nie altyd op dieselfde skaal geskied nie. Normaal word 'n kritiese kontrole uitgeoefen maar tydens siekte kan die prosesse gewysig word.

By volwassenes kan aktiewe beenmurg op 3 maniere uitsit: deur die vetterige murg te verdring, deur die omliggende beenskors te verdring en deur vermeerdering van die getal eritropoïetiese selle; by kinders met kroniese hemolitiese bloedarmoede kan radioloë die verdunning van die skors van die lang bene en die ‚hair-on-end'-voorkoms van die skedel uitken. Die groei en verdeling van selle is by die eritropoïese-proses in die beenmurg betrokke. Beenmurgpreparate toon mitoses op alle stadiums van sel-ontwikkeling, maar dit skyn asof die finale omskepping van normoblast in retikulosiet 'n postmitotiese proses is waarin die piknotiese kern eenvoudig weggewerp word. Die retikulosiet is die onmiddellike voorloper van die volwasse rooi bloedliggaampie.

Die jong eritropoïetiese selle, wat basofiliese kleuring toon ná gebruik van gewone kleurstowwe, bevat ribose nukleotides. Soos die globien (van die hemoglobien) in die sitoplasma begin vorm, kan polichromatofilie bespeur word. Die rypwording van eritropoïese selle in die beenmurg geskied in minder as 10 dae; dit word gestaaf deur studies van die murg ná hewige bloedstortings, deur die reaksie van kwaadaardige bloedarmoede tot geneeskundige behandeling, die herstel ná krisisse in aangebore hemolitiese geelsug en deur navorsing wat met radio-aktiewe isotope gedoen is.

Normaal bestaan die rooi bloedliggaampie in die perifeerbloed vir 100 tot 120 dae en soos dit bros word, word dit uiteindelik vernietig. Op enige hemoglobienstadium bly die toestand bestendig as eweveel rooi bloedliggaampies vervaardig en vernietig word. Sonder die stimulus van bloedarmoede kan normale eritropoïese vermoedelik nie aangewakker word nie, en, behalwe in die geval van polisitemie, kan die produksie van rooi bloedliggaampies nie aanmerklik verhoog word

EDITORIAL

ERYTHROPOIESIS

William B. Castle, well known for his original work on 'intrinsic factor—extrinsic factor' in relation to pernicious anaemia, has recently reviewed our present knowledge on erythropoiesis.[1]

The making of red blood cells consists essentially in the production and packaging of haemoglobin, but the differences in circulating red cells in various pathological states indicate that the formation of red cells and the production of haemoglobin do not always proceed at the same rate. Normally there is critical control but in disease there may be differences in the processes.

In the adult the active bone-marrow has the capacity to increase its size in three ways: by encroaching on the fatty marrow, by an increase in the number of erythropoietic cells, and by encroaching on the surrounding bone cortex; radiologists can recognize the thinning of the cortex of the long bones and the 'hair-on-end' appearance of the skull in chronic haemolytic anaemias of childhood. The process of erythropoiesis in bone-marrow involves growth and division of cells. Bone-marrow preparations show mitoses at all levels of cell differentiation, but the final conversion of normoblast to the reticulocyte appears to be a post-mitotic process in which the pyknotic nucleus is simply discarded. The reticulocyte is the immediate precursor of the adult red cell.

The early erythropoietic cells (young erythroid cells), which show the basophilic staining with ordinary stains, contain ribose nucleotides. As the globin of haemoglobin begins to form in the cytoplasm polychromatophilia is apparent. Maturation of the erythropoietic cells in the bone-marrow occurs in less than 10 days, as shown by studies of the marrow after severe haemorrhage, the response to therapy in pernicious anaemia, the recovery from crises in congential haemolytic jaundice, and studies with radio-active isotopes.

The red cell normally survives in the peripheral blood for 100-120 days. Eventually it becomes destroyed as it becomes fragile. A steady state exists at any haemo-

nie tensy die konsentrasie hemoglobien in omloop aanmerklik daal. 'n Vermindering in die hoeveelheid suurstof in die slagaarbloed lei tot 'n verhoogde produksie van rooi bloedliggaampies. Afgesien van sulke vanselfsprekende oorsake van suurstofgebrek in die bloed soos die verlies of vernietiging van rooi bloedliggaampies, hoogte, hart- of longkwale, kan die toename in eritropoïese te wyte aan kobalt miskien toegeskryf word aan komplekse wat dit met suurstof vorm. 'n Verhoging in die hoeveelheid of die spanning van suurstof het die teenoorgestelde uitwerking. Dit is derhalwe nie die getal rooi bloedliggaampies nie maar die hoeveelheid hemoglobien in omloop—wat in noue verband met suurstofspanning staan—wat eritropoïese beheer. Die hemoglobienkonsentrasie bepaal waarskynlik die hoeveelheid suurstof wat gewoonweg die beenmurg bereik, maar afgesien van die stimulus van slagaar-suurstofgebrek, is daar rede om aan te neem dat vloeistof 'n indirekte invloed op eritropoïese uitoefen. Die milt het ook een of ander direkte of indirekte uitwerking op eritropoïese.

Fisiologiese en patologiese veranderings in eritropoïese gee aanleiding tot die produksie van rooi bloedliggaampies met abnormale grootte, kleur en vorm. Castle bespreek die eienskappe van sulke selle, en skenk volle aandag aan die probleme van abnormale eritropoïese. Die steurings wat volg op voedingsgebrek, buislose kliergebrek, vergiftiging van uitwendige of inwendige oorsprong en meganiese inmenging met die werking van die beenmurg, lei tot bloedarmoede as gevolg van die verswakte aktiwiteit van die beenmurg. 'n Paar spesifieke voedingstekorte kan die oorsaak wees dat eritropoïese by die mens nie tred hou met die normale vernietigingsproses van die rooi bloedliggaampies nie. Giftige stowwe kan eritropoïese, of een of ander ontgiftigingsmeganisme in die lewer, benadeel met die gevolg dat die beenmurg gewoonlik te veel eerder as te min selle bevat; sommige van die onvolgroeide selle kan miskien soos die megaloblasts van kwaadaardige bloedarmoede lyk.

Die oorspronklike werk bevat 'n uitstekende en volledig gedokumenteerde verslag oor eritropoïese.

1. Castle, W. B. (1954): Bull. N.Y. Acad. Med., **30**, 827.

globin level when red-cell production equals destruction. Presumably no increase above the normal rate of erythropoiesis can occur without the stimulus of anaemia and, except in polycythaemia, a marked increase in red-cell production cannot occur unless there is a marked reduction in the concentration of circulating haemoglobin. It has been shown that the stimulus to increased red-cell production is a reduction in the amount of oxygen in the arterial blood. It is interesting that apart from such obvious causes of anoxia as red-cell loss or destruction, altitude and heart or lung disease, the increased erythropoiesis produced by cobalt may be due to complexes it forms with oxygen. Increase in the amount or tension of oxygen has the opposite effect. Thus erythropoiesis is controlled not by the number of red cells but by the amount of circulating haemoglobin, which is closely related to oxygen tension. Normally the haemoglobin concentration would appear to determine the amount of oxygen brought to the bone-marrow but, apart from the stimulus of arterial anoxia, there is good evidence for an indirect humoral effect on erythropoiesis. The spleen also has some direct or indirect influence on erythropoiesis.

Physiological and pathological alterations in erythropoiesis result in the production of red cells of abnormal size, colour, and shape. Castle discusses the features of such cells, and fully considers the problems of abnormal erythropoiesis. The disturbances produced by nutritional deficiency, endocrine deficiency, intoxicants of external or internal origin, and mechanical interference with bone-marrow function, cause anaemia from hypo-activity of the bone-marrow. A few specific nutritional deficiencies cause erythropoiesis in man to lag behind the normal rate of red-cell destruction. Toxic substances may impair erythropoiesis or some detoxifying mechanism, perhaps in the liver, resulting in a bone-marrow which is more commonly hypercellular than hypocellular; some of the immature cells may resemble the megaloblasts of pernicious anaemia.

The original review must be consulted for an excellent and fully documented account of erythropoiesis.

1. Castle, W. B. (1954): Bull. N.Y. Acad. Med., **30**, 827.

CRYSTALS

A typical crystal is regularly geometric in its form, with sharp edges and plane surfaces. The regular outer form is due to a regular aggregation of smaller units having a uniform geometrical shape. This internal arrangement of the smaller units is the most important characteristic of a crystal. There is a constancy of the interfacial angles, though crystals may vary in size and in difference of faces according to different circumstances under which they are formed. When fractured a crystal breaks into pieces which have their plane surfaces meeting in sharp edges.

All solids are regarded as crystalline, but certain rigid solid substances such as glass and colophony do not possess all the properties of crystals and are regarded as supercooled liquids. The latter have a very high viscosity. Their molecules are very complex and not usually arranged in the way necessary to give crystalline form. When fractured they break as easily in one direction as in another.

While crystals have been described in simple and obvious terms such as needle-shaped or as prisms, plates and so forth, terms like these are of no help in the classification based on the disposition of the crystallographic axes.

It has been found by X-ray analysis of crystals that the constituent particles are arranged at the points of lattice structures of different types. Ions occupy the corners of the lattice in true salts; in sodium-chloride crystals sodium and chlorine ions are arranged in a cubic lattice. In the diamond a carbon atom has 4 other carbon atoms arranged around it in a tetrahedral lattice. Instead of ions or atoms the particles

occupying the corners of the lattice may be molecules, as in the case of non-ionized organic compounds. The structure of many compounds has been determined by X-ray study, as for instance that of benzylpenicillin (penicillin G). Silk, cellulose and wool have minute elongated crystals distributed in parallel fashion in the length of the fibres.

Many substances of similar chemical composition form crystals which are similar in shape (isomorphous); for example, magnesium sulphate and zinc sulphate, and the alums. Not uncommonly, however, substances have similar crystalline form without any similarity in the chemical constitution.

The water of crystallization in certain crystals, for example copper sulphate pentahydrate, forms part of the structure of the crystals. In this particular compound, 4 of the molecules of water are attached to the copper (cation) and one is more firmly attached to the sulphate (anion). In alum there are 24 molecules of water combined with the aluminium-sulphate molecule. There are of course crystalline salts which contain no water of crystallization.

The process of crystallization most times involves crystallization from a solvent, the crystals separating commonly during cooling; the rate of the crystallization and the size of the crystals depend on a number of factors. Substances produced by precipitation are usually microcrystalline. Here again there are several factors which determine the character of the precipitate. Novel processes have been devised for the manufacture of micro-crystalline drugs. By taking advantage of different solubilities crystalline substances may be obtained free of associated impurities. By repeated re-crystallization the material may eventually satisfy physical and chemical tests for purity.

The water of crystallization may be driven off by heat or spray drying to yield exsiccated forms of a drug; such exsiccated compounds are not necessarily anhydrous.

Doctors these days do not see many drugs in the form of crystals, because most drugs are put up in tablets or capsules or in solution for injection. The pharmaceutical chemist must have an understanding of the physico-chemical properties of solids and liquids. A recently revised and modernized text-book is now available to those interested in the various aspects of modern pharmaceutics.[1]

1. Davis, H. (1954): *Bentley's Textbook of Pharmaceutics*, 6th ed. London: Baillière, Tindall and Cox.

SOME FURTHER OBSERVATIONS ON BILHARZIASIS IN THE TRANSVAAL

S. ANNECKE, R. J. PITCHFORD AND A. J. JACOBS

Department of Health, Tzaneen

The Transvaal north of the Highveld can conveniently be divided into the Lowveld, east of the Drakensberg, and the Bushveld, west of it. The eastern slopes of this mountain range are very well watered by numerous small streams, all of which eventually drain into bigger rivers flowing east. The altitude of the Lowveld varies from about 500 to 2,500 feet above sea level, that of the Bushveld (Middleveld) round about 3,000 feet. (The true Highveld has an altitude around 5,500 feet.) Rainfall occurs in the summer in both regions and varies from 500 to 1,000 mm. per annum.

Since days gone by Natives have inhabited the mountain slopes, but nowhere have they established irrigation projects. The available waters were used as nature provided them, for all purposes—washing, bathing and drinking. They and their animals use the same water supply. Small streams are preferred to larger ones because of the fears of drowning and crocodiles.

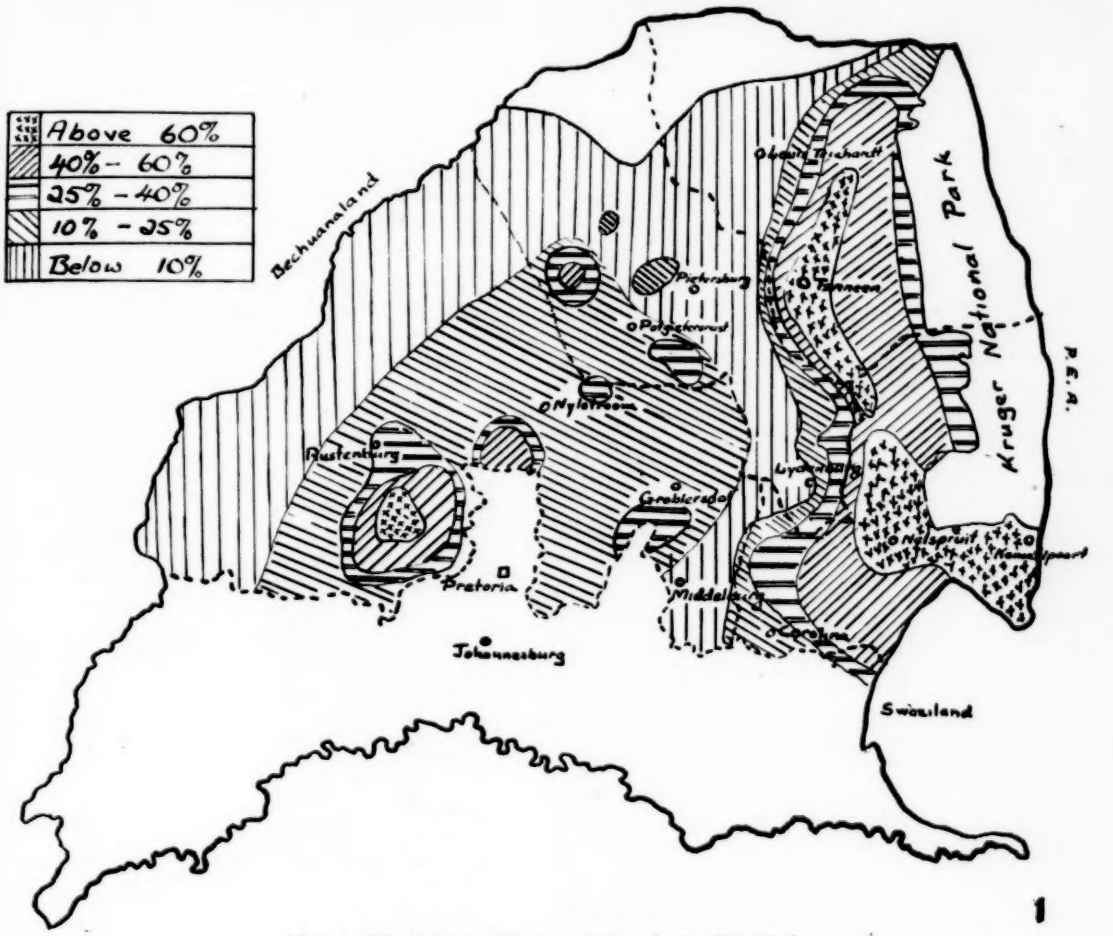
The natural streams throughout the Bushveld and Lowveld harbour *Physopsis* and *Biomphalaria* snails, the suspected snail hosts of *Schistosoma haematobium* and *S. mansoni* respectively. Constant contact between human and snail has therefore probably been maintained ever since Natives inhabited the country, well over a century ago.

The extent of this area exceeds 60,000 square miles and it is inhabited by more than 1½ million Natives and 160,000 Europeans. It is shown in Map 1, in which the distribution of *S. haematobium* is indicated. Maps 2 and 3 show the distribution of *S. mansoni* in parts of the Lowveld (the survey in Letaba—Map 2—is not completed). The major part of it corresponds with the malaria areas of the Transvaal but bilharziasis extends beyond the borders of the malaria areas north of a line from east to west through Johannesburg.

The greater movement of Natives, both within and without the Union, has undoubtedly led to infection of snails and incidence of human bilharziasis where the disease was previously unknown. The snail hosts of the disease are distributed throughout and, if infection is brought to them, human bilharziasis must occur.

S. haematobium for example has been found as far west as the magisterial areas of Waterberg, Rustenburg, Brits and Zeerust, with incidence up to 90% amongst Native school children.[1] The distribution of the disease in these vast areas in the west in association with streams flowing west into the Limpopo basin is patchy; it is extraordinarily intense in pockets. One would imagine that cattle, using the same waters, would show evidence of disease; and it is in one such pocket that humans have been found infected with 'probable cattle schistosomes' and the infection has been under observation for some years now.[1]

In the Johannesburg area *S. haematobium* incidences up to 20% have been found.[2] In the south-east both forms of the disease stretch continuously from the



Map 1. Distribution of *S. haematobium* in the Transvaal.

Transvaal into Mozambique in the east and into Swaziland and Natal in the south; thus the continuity of the Transvaal hyper-endemic bilharzia area east of the Drakensberg is maintained into the adjoining territories.

The two major townships in this hyper-endemic bilharzia region, Tzaneen (long. 30° 15′ E, lat. 23° 45′ S) and Nelspruit (long. 31° 0′ E, lat., 25° 30′ S) form the extreme northern and southern ends of the hyper-endemic bilharzia region, between the Drakensberg escarpment in the west and the borders of the Kruger National Park in the east.

EARLIER SURVEYS

S. haematobium has been known to exist in the Northern Transvaal for many decades. Blood in the urine and other unpleasant symptoms of the disease are the main reasons why attention was directed to it in the past. Pioneer work was done to determine the incidence of *S. haematobium* as far back as 1935 when the Transvaal malaria staff examined urine specimens from Natives in the Northern Transvaal. At the time it was not realized that *S. mansoni* was also rife, although occasional cases were diagnosed by examination of urine. In recent surveys cases presumably of *S. bovis* have been discovered in urine [3] and faeces,[1] but these are few in number.

Table A gives the incidence of *S. haematobium* among Native school-children in the vicinity of Nelspruit in 1935, Table B the incidence along the eastern slopes of Zoutpansberg in 1937, and Table C the incidence in the vicinity of Tzaneen along the eastern slopes of the Drakensberg in 1938. In all these surveys a single

TABLE A. INCIDENCE OF S. HAEMATOBIUM IN NATIVE SCHOOL-CHILDREN IN THE VICINITY OF NELSPRUIT IN 1935

Age-group (years)	*Number Examined*	*Number Positive*	*Percentage Positive*
5— 9	342	187	51·4
10—14	464	291	61·2
15—19	209	150	71·8
20—29	41	29	70·7
Total	1,056	657	62·2

Map 2. Letaba District, Eastern Transvaal. Incidence of *S. mansoni*.

TABLE B. INCIDENCE OF S. HAEMATOBIUM IN NATIVE SCHOOL-CHILDREN LIVING ALONG THE EASTERN SLOPES OF THE ZOUTPANSBERG 1937

5— 9	485	184	37·9
10—14	747	281	37·6
15—19	309	102	33
20—29	26	7	27
Total	1,567	574	36·6

TABLE C. INCIDENCE OF S. HAEMATOBIUM IN NATIVE SCHOOL-CHILDREN LIVING ALONG THE EASTERN SLOPES OF THE DRAKENSBERG IN THE VICINITY OF TZANEEN 1938

5— 9	83	50	60·2
10—14	109	82	75·2
15—19	110	67	60·9
20—29	9	4	44·5
Total	311	203	64·3

TABLE D. INCIDENCE OF S. HAEMATOBIUM AMONG NATIVES IN THE VICINITY OF NELSPRUIT IN 1939

Number Examined	1,773
Number Positive	683
Percentage Positive	38·5

specimen of urine from each person was examined and a mechanical centrifuge was used. This technique will probably give a slightly higher incidence of the disease than sedimentation of urine for a fixed period of time, which is the technique used in recent work.

It will be seen that there is no significant difference between the incidences at Tzaneen and Nelspruit, both of which fall in the highly endemic area east of the Drakensberg escarpment. The eastern slopes of the Zoutpansberg area is very mountainous and the Natives live along the main mountain streams, which have a relatively small snail population, which factors almost certainly account for the lower haematobium rate in this area.

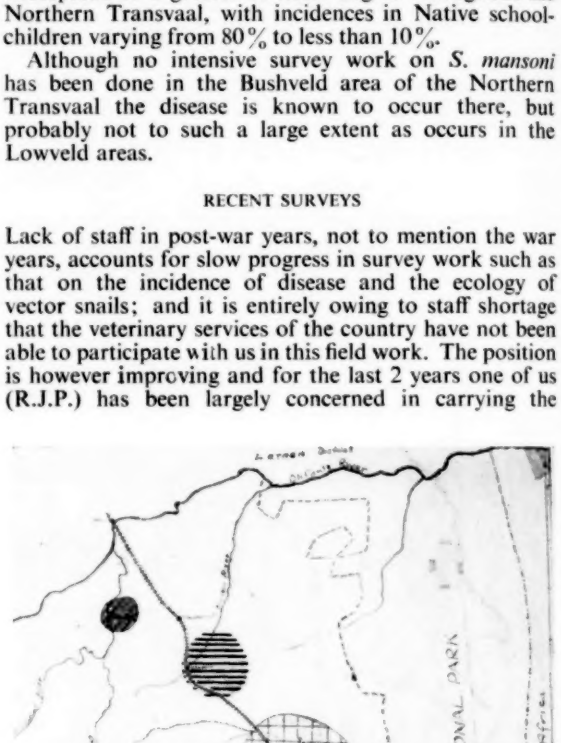
Further work was done in 1939 on the incidence of *S. haematobium* in the vicinity of Nelspruit—Table D. Unfortunately the investigator did not record the age-groups of his cases and we can therefore only give the grand total of his findings. The figure is lower than that of 1935, but more adult Natives may possibly have been examined in the 1939 survey, which might account for the lower incidence.

Further evidence of the incidence of urinary bilharzia in the Northern Transvaal has been given by Annecke and Peacock.[4] It was found that urinary bilharzia was widespread to a greater or lesser degree throughout the Northern Transvaal, with incidences in Native school-children varying from 80% to less than 10%.

Although no intensive survey work on *S. mansoni* has been done in the Bushveld area of the Northern Transvaal the disease is known to occur there, but probably not to such a large extent as occurs in the Lowveld areas.

RECENT SURVEYS

Lack of staff in post-war years, not to mention the war years, accounts for slow progress in survey work such as that on the incidence of disease and the ecology of vector snails; and it is entirely owing to staff shortage that the veterinary services of the country have not been able to participate with us in this field work. The position is however improving and for the last 2 years one of us (R.J.P.) has been largely concerned in carrying the



Map 3. Pilgrimsrest, Nelspruit and Barberton Districts, Eastern Transvaal. Incidence of *S. mansoni*.

problem forward in a small, but intensely infected, area situated precisely where the greatest ravages of malaria also occurred.

With the recession of malaria, both the lay public and the medical profession are becoming more and more concerned about the bilharzia position, which over large tracts of country has assumed gigantic proportions. There is no reason to think that the incidence has lessened over the last 20 years. All evidence in fact points to the contrary; and it is certain and obvious that with the introduction of irrigation schemes, the position has greatly deteriorated in European farming areas in the Lowveld region from Tzaneen to Komatipoort.

Technique. In putting the survey work into action the following technique was gradually evolved: All urine was collected about 10 a.m., thus ensuring at least a little exercise on the part of the patient beforehand. The whole contents of the bladder was voided into a bottle. The urine was then allowed to stand for at least 1½ hours and examination was made of urine pipetted from the bottom. No centrifuge was used, only one examination of each specimen was carried out, positives were recorded only when ova were recovered, and only a single examination was made on each patient.

The diagnosis of *S. monsoni* was likewise made on a single examination of stool. The glacial acetic acid and ether technique was used, again without centrifuge, the specimens being allowed to sediment after the addition of ether for at least ½ hour before examination. All collections of specimens were made in the field, where the amount of faeces that could be held on the tip of the index finger was put directly into 5 c.c. of glacial acetic acid. The remainder of the procedure and examinations were done later in the day.

It is admitted that a single examination of urine and faeces is insufficient to produce an accurate bilharziasis *rate*, but that was not the intention; what was intended was to get comparative figures which would give an idea of the intensity, extensiveness and severity of the two diseases.

Age was guessed at.

Country and People. Unless otherwise stated all material under subsequent discussion was taken from the Lowveld farming areas between Komatipoort and Kaapmuiden and further north round Klaserie, and from the Native Reserve areas east of White River and north of the eastern border of Swaziland. All areas are strictly comparable as far as geographical, climatic and general ecological factors are concerned. The survey is confined to non-Europeans.

Geographically the country is gently undulating (varying to hilly) low-lying (600-3,000 feet) bush country, breaking into 'park land' in the Native Reserve areas where the thick bush has been cleared, and of course giving way to cleared, cultivated, irrigated lands in the European farming areas. The soil is largely red with a high calcium content. The rainfall, about 550-800 mm. a year, occurs in the hot summer months from about the end of September and beginning of October to about March. The average maximum and minimum summer temperature is about 87·6°F and 65·9°F respectively and winter about 73·0°F and 46·0°F. These figures are based on Nelspruit town.

The Natives are Shangaans, with an admixture of Swazis more pronounced further south. For practical purposes their habits, diet, etc. are similar. A large proportion of them are detribalized or bastardized and it was felt that it would be an impossible and useless task to attempt to separate them for the purpose of this survey.

The area can conveniently be divided up into European farming areas with irrigation systems, and Native Reserve areas with no irrigation systems.

European Farming Areas

These areas, as far as bilharzia is concerned, can be further divided up into (1) farms that offer no protection against bilharzia and (2) farms where there is a measure of protection. The farmer is usually completely unconcious about the protection his farm offers; he has done nothing to bring it about, and it is due entirely to factors beyond his control.

All farm land in the Lowveld is dependant for its water supply on irrigation systems. The water is either pumped into canals and dams from the main rivers or the canals open directly from the main river, and feed a series of subsidiary canals and dams from which lands are irrigated. The Natives are housed in compounds, the huts usually being built in close proximity to each other, generally on the banks of the canals and small streams, or on the banks of the large rivers. Faecal contamination of the waters is maximal in the rainy season when all faeces is washed down into the waters. The Native does not walk very far from his hut to defaecate. Latrine accommodation is almost entirely non-existent and bathing and washing facilities are afforded by the canals and dams or by a small stream which might run through or near the compound; occasionally washing is done in the large rivers. This then is the general picture of the Natives' living conditions in relation to bilharzia in the European farming areas of the Lowveld.

(1) *Farms affording no protection against bilharzia.* The above general picture of living conditions suffices. The waters are polluted by faeces washing into them during rains and by Natives urinating when bathing and washing. The dams act as *culs-de-sac* for snails and cercariae, and are ideal bathing places for the Natives. The small streams, too, are often dammed up by the Native to enable him to do his washing. The total percentage *S. mansoni* intensity on these farms (for all ages) is 68·5 and *S. haematobium* 66·7. Detailed figures in age-groups are given in Table I.

Table IB is compiled from evidence in the adjoining district of Letaba and covering the examination of 1,600 specimens of urine and 1,600 of faeces taken from areas with various densities of snails and bilharzia, over the whole region (including European farming areas, Native Reserves and Trust Lands). It shows the same curve of the graph. Commencing in the age-groups below 4 years bilharzia (both forms) reaches its peak in the age-groups from 10 to 20 years and then the incidence gradually diminishes.

The picture is one of continuous re-infection starting in earliest childhood (the youngest infant found infested

with *S. haematobium* was 5 months old and with *S. mansoni* 7 months) and continuing almost daily throughout life. The snail infectivity rates, although varying with the time of the year (see Table IA), are evidence that re-infection by both parasites can easily occur during every month of the year.

In Table I the *S. haematobium* intensity does not appear to diminish until 20-29 years of age, after which it declines with increasing age. The *S. mansoni* intensity remains high till the 'over 50' age-group is reached.

(2) *Farms affording the Natives some protection from bilharzia.* These farms are found scattered amongst the preceeding ones and though the protection afforded is not great, particularly as the Natives are prone to wandering about, it is sufficient to cause a significant difference in the bilharzia intensity, especially with *S. mansoni.*

The living conditions of the Natives differ in no way whatsoever but differences are found in the water supplies. For example (i) the dams are built up above the ground and receive a pumped water supply, (ii) there are closed canals, (iii) some structure such as a railway line is situated between the compound and the dam or canal, (iv) there are piped water supplies either from boreholes or dams, or (v) the Natives repeatedly wash in large flowing rivers, where contamination is rapidly diluted. All the above conditions will tend to reduce faecal contamination of the water supply.

The total percentage *S. mansoni* intensity in these protected areas for all ages is 29·3% and *S. haematobium* is 49·5% for all ages. Detailed figures in age-groups are given in Table II. The differences for both the forms of bilharzia is significant, compared with the 'no protection' farms. In *S. haematobium*, the difference lies in the 0-4 and 5-9 age-groups and the more gradual build-up of *S. haematobium* in Natives on the 'protected' farms might very well be due to bathing and migrating habits of children increasing with age—i.e. they become more heavily infected when bathing outside their own protected area (they need not necessarily of course go and bathe in areas heavily infested with *S. mansoni*; in fact the difference in all age-groups of *S. mansoni* intensity in the two groups of European farming areas is sufficient to show that they do not, and probably prefer to return in the summer to the Native Reserve areas (where the *S. mansoni* rates are comparable) to help with ploughing and planting.

Unfortunately no snail infectivity rates are available for these areas. There are only 2 observations: (i) Of 38 *Biomphalaria* snails taken from the sides of a large flowing river directly below a compound 33% were found shedding mammalian cercariae in March, (ii) No infected *Biomphalaria* have ever been recovered, after diligent search, from built-up dams which are protected from contaminated flood waters washing from the compounds.

The picture then in the two sets of European farming areas is (*a*) an area of very high endemicity for both *S. mansoni* and *S. haematobium* in all age-groups, and (*b*) an area of moderately high endemicity for *S. mansoni* in all age-groups and for *S. haematobium* a moderately high endemicity in age-groups up to 9 years followed by high endemicity in later years. It is realized that the phrase 'moderately high endemicity' is a gross understatement but it does serve as a means of comparison, where one group of conditions causes complete saturation with the two diseases and the other group not such complete saturation.

Native Reserve Areas

These are large tracts of country where the Natives live more or less scattered about, never as closely congregated as in the compounds of European farming areas, usually in close proximity to water but very seldom actually on the banks of the streams or rivers. There are no irrigation systems and the very few dams that exist have been built in the last year or two and probably have not yet (at time of survey) had time to alter the general bilharzia picture. It may be that they will not alter it, as long as the Natives remain living scattered about. All washing and bathing is done in the small streams and rivers. These, with few exceptions, pool up in the dry winter months.

The *S. haematobium* intensity throughout the Reserves is high and in every way comparable to that in the European farming areas with no protection; there is, however, a significant difference between the *S. mansoni* intensities of these two areas, whereas there is no difference between the *S. mansoni* intensities in the Reserves and those areas where farms offer some protection (Table III). This comparatively low *S. mansoni* intensity in the Reserves is thought to be due to the fact that the Natives live more or less scattered about and further away from water. Their faeces likewise are scattered and further from the water, with the result that the contamination in polluted water reaching the streams during the rainy season is not as great as it is in the concentrated compounds of European farming areas.

The Native Reserve areas can then be classified as areas of high *S. haematobium* endemicity and moderate *S. mansoni* endemicity.

The *snail infectivity rates* (Table IIIA) throughout the year is considerably higher for *Physopsis* snails throughout the Native Reserve area than it is in European farming areas. This might easily be due to the decrease in volume of water and increase in the number of snails per unit volume of water during the dry winter in the reserves. No such decrease of water volume occurs in the controlled irrigation systems of European farms, with the result that contamination by urine in these farming areas will tend to decrease when coupled with the fact that very little if any bathing goes on during the winter months.

The Biomphalaria infectivity rate (Table IIIA) is, as expected, much lower throughout the year in the Reserves, and is very low indeed during the winter. The same chances therefore of continuous re-infection with *S. mansoni* do not exist in the reserves as they do in the European farming areas. The risk of re-infection with *S. haematobium*, however, remains high throughout the year.

Native Immigrants to European Farming Areas

A great deal of the farm labour is migrant from Portuguese East Africa. Living conditions there differ in no way from conditions in the Native Reserve areas in this country, and in a small series of some 200 odd

cases it would appear that the bilharzia picture is the same. These Natives, (all ages) arrive in the European farming areas and for the first 3 months have a *S. mansoni* intensity of 40% as against 33% amongst Natives in the Eastern Transvaal Reserve areas. After a further 3 months the figure has risen to 55% and after 6 months more the figure is 65% as against 68% amongst Natives (all ages) who had lived some years in the European farming areas (see Table IV).

There is a much less marked rise in the *S. haematobium* intensity for the same period amongst the same Natives.

It would appear then that it takes 6-12 months only for Natives immigrant to the European farming areas of the Lowveld to become saturated with intestinal and vesical bilharziasis.

Snails

The vector snails, *Physopsis spp* and *Biomphalaria spp*, are widespread throughout the area. *Biomphalaria spp* are about twice as numerous as *Physopsis spp*, even though pockets occur where *Biomphalaria* is apparently non-existent. No such pockets have been observed in the case of *Physopsis*. The most heavily infested waters are small dirty streams and ditches, with ground dams and irrigation systems coming a close second. Both vector snails are capable of prolonged 'hibernation' in dried-up mud during the winter months, but for how long this hibernation is possible, is unknown.

Bulinus (*Bulinus*) *forskali* occurs in the area, but so far it has not been found shedding mammalian-type cercariae. *Lymnaea natalensis* likewise has never been found infected with mammalian blood flukes. These findings agree with those of previous workers (forskali, however, has been incriminated as vector on the island of Mauritius, though doubt has been cast on this[5, 6]).

Snail infectivity rates for the whole area are given in Table V. The numbers in this table (and also Tables IA, IIIA and VA) refer to adult snails only. Baby snails were not examined after it was ascertained that very few if any of them shed cercariae. The *Physopsis* infectivity rate shows some variation from month to month. The *Biomphalaria* infectivity rate shows a marked drop during the winter months, while, unlike *Physopsis* the number of snails taken from month to month does not alter to any marked extent. Table VA, compiled from evidence in the Letaba district, bears out further that there is no time of the year when one can enter surface waters with safety. Chances of infection are, however, slightly diminished during the winter months owing to lowered snail infectivity rates, but it must not be forgotten that in Native Reserve areas the total volume of water is greatly diminished at that season, which will tend to increase chances of infection (*a*) because the rivers become pooled and (*b*) because the number of infected snails per unit volume of water will increase.

CONTROL

It is true that the work of the Transvaal Bilharzia Committee over 20 years has lessened to some extent the incidence of the disease in the lightly afflicted areas (*a*) by treatment of school-going children (chiefly European) at school treatment camps and (*b*) by preventive propaganda carried out by school-teachers, which in certain areas, e.g. Brits irrigation settlement, has brought about the provision of closed and piped water supplies and school swimming pools. This improvement without State aid has taken 15-20 years to bring about.

Nevertheless no *sustained* measures have yet been carried out, even in the hot regions of *hyper-endemic* bilharziasis, with the result that bilharzia today in the Transvaal is running a completely unchecked course.

Control measures should take the form of 2 and possibly 3 lines of attack against the disease:

(1) *Against the Vector*. Pilot schemes under varying field conditions are necessary to test techniques of snail vector control. Such measures, in the beginning, could more profitably be concentrated on small collections of water such as small streams and ditches, constituting as they do a source of re-infestation of humans, who in their turn reinfect broods of snails in the irrigation systems.[7] To spread control measures over large volumes of water would involve considerable initial expenditure which would not be justified. More advisable is a pilot-scheme attack against the snail vector, which would resolve itself into the application of some chemical to the small waters. This would be greatly facilitated by the enclosing or cementing of canals. Enclosure would prevent contamination by urine and faeces and by bathing, and make the use of molluscicides unnecessary. The cementing of canals would render denudation of vegetation unnecessary, and enhance the effectiveness of the molluscicide applied. Constant experimentation in the field is needed to determine a nice relationship between the molluscicide in use and water life generally. The destructive effect on water biology of molluscicides such as copper sulphate is appreciated. Trial and error alone will overcome these obstacles. Certain chlorophenols have been used with success in the East.[8] Preliminary field tests in our hands, however, are not very encouraging and this observation is supported by workers on the West Coast of Africa (Sierra Leone).[9]

(2) *Prevention of Contamination*. This form of control is applicable (*a*) to humans and (*b*) to waters.

(*a*) Decent adequate ablution facilities should be provided, with a piped water supply.

(*b*) (i) Latrine accommodation should be provided; one very big difficulty to surmount is the Native's habit of filling up a pit latrine or a water-borne sewage system with stones. (ii) Dams should be built up above the ground so that floodwater contaminated with faeces cannot wash into them. (iii) For the same reason canals should be covered.

These measures are formidable ones to institute in a country where today no latrine accommodation exists, no canals (with one or two exceptions) are cemented or covered, and all washing is done in the canals or dams because there are no ablution facilities. Nevertheless in time it should be achieved.

(3) *Mass Treatment*. As visualized today, mass treatment by drugs requiring injections over a period of at least 7-10 days is not thought practicable. It is time-consuming and expensive, it requires too many highly skilled staff (in the form of doctors and their attendants),

and the response both from the patient and his employer is not encouraging. It entails the treatment of *every Native* except possibly those under 3 months old. Mass treatment by nilodin or miracil D does not produce satisfactory results. Over 200 patients were treated with these drugs, but the follow-up results after 3 months obtained with the first 76 were not thought to justify re-examining any more (see Table VI). The test after treatment for *S. haematobium* was the finding of viable ova in the urine, and for *S. mansoni* the finding of normal-looking ova in two specimens of stool. The results before treatment were based on one examination of stool and urine. During the 3 months' interval the canals and dams were kept as free as possible of snails to minimize risk of reinfestation.

It is felt that until some effective form of treatment is discovered mass treatment of the *whole* Native population in this part of the country is impracticable. In any case it is useless unless some form of attack is instituted simultaneously against the vector. It might, however, be very well worth while to 'mass treat' children before they have had time to become saturated with the flukes and so attempt to prevent the later pathological lesions caused by the disease.

Control measures in Native areas present a far greater problem than the control in irrigated farming areas, where, theoretically, canals and dam systems offer a comparatively easy vector-problem compared with the small-river systems of the Native Reserve areas. Moreover, satisfactory ablution and washing facilities cannot be visualized in the Native Reserve areas.

To summarize, control of the disease involves (1) simultaneous attack on the vector and mass treatment of children only (we still lack a good drug for this purpose), and (2) general sanitary measures combined with cementing or covering-in of canals.

DISCUSSION

It is felt that conditions could hardly be worse in Natives on irrigated farming areas, with intensities of *S. mansoni* at 70% and *S. haematobium* at 80% (on one stool and urine examination, without centrifuge). This is thought to mean that 100% of the population who can be infected with schistosomes are in fact infected with both forms of the disease. Only infants who have not yet been allowed to play, or have not yet been bathed in the water, will be free. In a picture such as this whether the ova of *S. mansoni* and *S. haematobium* found in the survey are viable or not matters not at all. In actual fact no urine or faeces was discovered where the ova were obviously all dead, i.e. black, empty shells or grossly malformed. The important thing is that for all practical purposes the whole Native population is suffering from bilharziasis.

In the Reserve areas the same holds true for *S. haematobium* though the position is not quite so bad for *S. mansoni*.

Wright [10] has estimated that in Egypt the disease costs the country £20 million a year and reduces productivity by 35%. If this is so in Egypt, surely, on a proportionate basis, the same holds good in the Transvaal and other areas of South Africa where bilharzia is known to occur. It is hoped by a comparative study of Natives to be able to estimate to some degree what the disease is costing the country.

Effects

An attempt has been made in Table VII to tabulate the cause and effect of the disease:

(1) *Water Contamination*

(*a*) *By Urine.* This in summer is maximal in all waters that can be contaminated. The children spend most of their day in the ground dams, rivers and streams and of course empty their bladders at the same time. In winter they hardly spend more time than is necessary to wash themselves in the water and this source of contamination is greatly reduced compared to the summer.

(*b*) *By Faeces.* Although faeces has never been found actually deposited in the streams and dams the banks of both are favourite latrine sites for 2 reasons—(i) they afford some privacy and (ii) water is a more satisfactory cleansing material than a stone. Added to this, in summer-time a great deal of the faeces is washed into the water by rains and broken up. Floods will wash it away but not every rain that falls causes a flood. In the Reserve areas the river banks are not so heavily contaminated with faeces, probably because the Natives have further to walk and there is not the same need to seek privacy. Water contamination then is largely caused by (*a*) complete lack of latrine accommodation, (*b*) compounds being concentrated in the immediate vicinity of the water supply, (*c*) the water supply being unprotected, and (*d*) the washing of faeces by the rain into the rivers, dams, canals and small streams.

(2) *Snail Infectivity Rates*

Physopsis. In summer, out of 1,656 snails collected, 116 were discharging mammalian cercariae, i.e. 6·9%; in winter out of 697 snails collected 48 were discharging them, i.e. 6·8% (Table V; winter taken as May to September both inclusive). In the Letaba district 152 out of 1,132 *Physopsis* snails shed mammalian cercariae in summer, i.e. 13·4%; in winter 105 out of 1,062 snails discharged them, i.e. 9·4% (Table VA). There is no significant difference between the figures for the two seasons. There are possibly two cattle schistosomes which would upset these figures for human infectivity rates of *Physopsis*.

Biomphalaria. In summer, out of 3,680 snails collected, 87, or 2·3%, were infected; and in winter out of 1,926 collected, 20, or 1·03%, were infected (Table V). There is a significant difference between these figures. Further, this difference applies not only in Native Reserve areas, where in winter the infectivity rate is nil and in summer 1·3% (Table IIIA) but also in the European farming areas, where in winter the infectivity rate is 1·2% and in summer 3·2% (Table IA). This might be due to any of several reasons: (1) very little contamination of water by faeces occurs in winter (this is in fact true), (2) fluke development is protected in the snail during winter, and (3) the mortality of infected Biomphalaria during winter is high. In the adjoining Letaba district, in summer 44 out of 2,441, or 1·8%, *Biomphalaria* snails shed human-type cercariae; in winter 52 out of 1,040, or

5%, discharged them (Table VA). At the moment this high winter rate of infectivity is inexplicable and is receiving our closest attention.

It is assumed that *Biomphalaria* is the carrier of *S. mansoni* and that *Physopsis* is the carrier of *S. haematobium*. It is appreciated that *S. mansoni* not uncommonly infects the bladder,[11] and that therefore a certain amount of *S. mansoni* can be distributed *via* the urine; are these *S. mansoni* ova in the bladder viable? Certainly the greater number of *S. haematobium* ova in snips from rectum are non-viable.

Snail infectivity rates then appear to be dependant for *Physopsis* on (1) water supply and (2) volume of water and for *Biomphalaria* on (1) latrine accommodation and (2) summer rainfall.

(3) *Chances of re-infection*

These are obviously dependant on continued washing and bathing in the infected water. The chances are somewhat diminished from *Biomphalaria* during winter and remain high throughout the year from *Physopsis*. This last statement refers to snail infectivity rates only; the chances of re-infection from both snails are automatically diminished during the winter when much less time is spent by the children in bathing.

(4) *Bilharzia Intensity*

This is almost certainly dependant, for both forms of bilharzia, on lack of latrine accommodation, for *S. mansoni*, on concentrated housing in close proximity to water in European farming areas and scattered housing further from water in Native Reserves and, for *S. haematobium*, on open water supplies in both types of area.

SUMMARY

1. A picture is briefly given of the extent of the bilharziasis problem over the Northern Transvaal.

2. A more detailed account of the problem covering a small area of the Northern Transvaal has been attempted.

In both (1) and (2) the extraordinarily high incidence of both *S. haematobium* and *S. mansoni* in the Native population is revealed.

3. Control measures and some snail problems are briefly discussed.

TABLE I. NATIVES IN EUROPEAN FARMING AREAS WITH NO PROTECTION FROM BILHARZIA

Age Group	*S. haematobium* Number Examined	*S. haematobium* Number Positive	*S. haematobium* Percentage Positive	*S. mansoni* Number Examined	*S. mansoni* Number Positive	*S. mansoni* Percentage Positive
0— 4	60	35	58·3	19	15	78·9
5— 9	91	73	80·2	133	87	65·4
10—14	78	65	83·3	182	140	76·9
15—19	59	51	86·4	88	64	72·7
20—29	62	38	61·2	55	36	65·4
30—39	86	52	60·4	68	49	72·0
40—49	76	36	47·3	72	45	62·5
50+	48	24	50	58	27	46·5
Total	560	374	66·7	675	463	68·5

TABLE IA. SNAIL INFECTIVITY RATES IN AREAS WITH NO PROTECTION FROM BILHARZIA

	Jan.	*Feb.*	*Mar.*	*Apr.*	*May*	*Jun.*	*Jul.*	*Aug.*	*Sep.*	*Oct.*	*Nov.*	*Dec.*
Biomphalaria												
Number of snails ..	219	363	442	284	178	179	474	339	330	266	135	237
Number discharging cercariae	0	7	15	20	8	2	4	2	2	12	3	6
Percentage discharging cercariae	0	1·9	3·3	7·0	4·4	1·1	0·8	0·5	0·6	4·5	2·2	2·5
Physopsis												
Number of snails ..	150	161	113	136	51	38	74	56	55	22	19	24
Number discharging cercariae	9	8	6	5	3	1	2	4	12	1	1	0
Percentage discharging cercariae	6	4·9	5·3	3·6	5·8	2·6	2·7	7·1	21·8	4·5	5·2	0

TABLE IB. THE NATURAL INCIDENCE IN THE LETABA DISTRICT OF S. HAEMATOBIUM AND S. MANSONI AMONGST NATIVES OF ALL AGE-GROUPS FROM AREAS OF DIFFERENT DENSITIES OF SNAILS AND BILHARZIASIS

Age-Group	*S. haematobium* Number Examined	*S. haematobium* Number Positive	*S. haematobium* Percentage Positive	*S. mansoni* Number Examined	*S. mansoni* Number Positive	*S. mansoni* Percentage Positive
0— 4	84	26	33·3	84	19	22·6
5— 9	326	162	49·4	326	89	27·3
10—14	426	264	62·0	426	185	43·4
15—19	196	117	59·7	196	63	32·6
20—29	186	71	38·2	186	45	24·2
30—39	222	53	23·9	222	64	28·8
40—49	133	30	22·6	133	30	22·6
50+	42	12	28·6	42	6	14·3
Total	1,615	735	45·5	1,615	501	31·0

TABLE II. NATIVES IN EUROPEAN FARMING AREAS WITH SOME PROTECTION FROM BILHARZIA

Age-Group	*S. haematobium* Number Examined	*S. haematobium* Number Positive	*S. haematobium* Percentage Positive	*S. mansoni* Number Examined	*S. mansoni* Number Positive	*S. mansoni* Percentage Positive
0— 4	86	21	24·4	109	13	11·9
5— 9	73	42	57·5	85	24	28·2
10—14	35	28	80	42	17	40·4
15—19	29	23	79·3	26	9	34·6
20—29	47	24	51·0	42	18	42·8
30—39	82	45	54·8	80	31	38·7
40—49	64	30	46·8	58	17	29·3
50+	19	6	31·5	18	6	33·3
Total	435	219	50·3	460	135	29·3

TABLE III. NATIVES IN RESERVE AREAS

Age-Group	*S. haematobium* Number Examined	*S. haematobium* Number Positive	*S. haematobium* Percentage Positive	*S. mansoni* Number Examined	*S. mansoni* Number Positive	*S. mansoni* Percentage Positive
0— 4	22	10	45·4	20	4	20
5— 9	21	15	71·4	126	34	26·9
10—14	30	22	73·3	232	63	27·0
15—19	53	42	79·2	89	40	44·9
20—29	74	54	72·9	52	26	50
30—39	50	31	62	33	16	48·4
40—49	23	9	39·1	18	8	44·4
50+	11	4	36·3	7	2	28·5
Total	284	187	65·8	577	193	33·4

TABLE VI. PATIENTS TREATED WITH NILODIN AND MIRACIL D

	S. haematobium Percentage positive before treatment	*S. haematobium* Percentage positive 3 mths. after treatment	*S. mansoni* Percentage positive before treatment	*S. mansoni* Percentage positive 3 mths. after treatment
Patients treated with nilodin 130 mg. per kg. body-weight (46)	80·4	47·8	69·5	71·7
Patients treated with miracil D (30)	60·0	66·6	70	63·3

TABLE IIIA. SNAIL INFECTIVITY RATES IN NATIVE RESERVE AREAS

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Biomphalaria												
Number of snails	163	162	281	124	33	70	39	33	78	92	101	60
Number discharging cercariae	7	2	0	0	0	0	0	0	0	4	0	0
Percentage discharging cercariae	4·2	1·2	0	0	0	0	0	0	0	4·3	0	0
Physopsis												
Number of snails	119	187	115	123	67	63	52	49	31	51	53	16
Number discharging cercariae	13	18	8	13	5	12	1	3	3	5	2	0
Percentage discharging cercariae	10·9	9·6	6·9	10·5	7·4	19·0	1·9	6·1	9·6	9·8	3·7	0

TABLE IV. S. HAEMATOBIUM AND S. MANSONI INTENSITIES IN NATIVES IMMIGRANT TO EUROPEAN FARMING AREAS FROM PORTUGUESE EAST AFRICA

Time in European Farming Areas (months)	*S. haematobium* Number examined (all ages)	*S. haematobium* Number Positive	*S. haematobium* Percentage Positive	*S. mansoni* Number examined (all ages)	*S. mansoni* Number Positive	*S. mansoni* Percentage Positive
0— 3	128	82	64·0	121	49	40·4
4— 6	44	31	70·4	43	24	55·8
7—12	76	60	78·9	63	41	65·0

TABLE V. TOTAL SNAIL INFECTIVITY RATES FOR WHOLE AREA

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Biomphalaria	485	687	932	446	224	297	535	387	483	435	335	360
Number infected	11	10	15	22	9	2	4	2	3	20	3	6
Percentage infected	2·2	1·4	1·6	4·9	4·0	0·6	0·7	0·5	0·6	4·5	0·8	1·6
Physopsis	355	475	319	296	144	137	162	144	110	79	88	44
Number infected	23	35	28	21	10	13	3	7	15	6	3	0
Percentage infected	6·4	7·3	8·7	7·0	6·9	9·4	1·8	4·8	13·6	7·5	3·4	0

TABLE VA. SNAIL INFECTIVITY RATES IN LETABA DISTRICT

	1953 Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	1954 Jan.	Feb.	Mar.	Apr.	May
Biomphalaria												
Number of snails	176	151	168	391	407	437	616	366	246	242	127	154
Number discharging cercariae	9	8	11	24	12	9	5	2	12	0	4	0
Percentage discharging cercariae	5·1	5·3	6·6	6·1	3·0	2·1	0·8	0·5	5·0	0	3·1	0
Physopsis												
Number of snails	224	278	144	253	140	146	151	90	175	207	223	163
Number discharging cercariae	32	32	4	20	38	12	27	17	12	22	24	17
Percentage discharging cercariae	14·3	14·6	2·8	7·9	27·9	8·2	17·9	19·0	6·9	10·6	19·5	10·4

TABLE VII

Cause	European Farming Areas (1) *No protection afforded*	European Farming Areas (2) *Some protection afforded*	Native Reserve Areas
Housing	Concentrated in compounds in immediate vicinity of water	Concentrated in compounds in immediate vicinity of water	Scattered
Water supply (bathing and washing)	Irrigation systems. Sunken dams and open canals, small streams	Built-up dams, closed canals, standpipes, large rivers etc.	Small streams and rivers which pool up in the winter
Latrine accommodation	Nil	Nil	Nil
Volume of water			
Summer	100%	100%	100%
Winter	100%	100%	100%
Rainfall	In summer	In summer	In summer
Effects			
Water contamination*			
Urine	Maximal in summer. Moderate in winter	Maximal to nil in summer. Low in winter	Maximal in summer. Moderate to minimal in winter
Faeces	Maximal in summer. Low in winter	Never maximal at any times	Low to moderate in summer. Very low in winter.
Snail infectivity rate			
Physopsis	Winter (May to Sept.) 8·02% Summer (Oct. to Apr.) 4·7%	Winter ? Summer ?	Winter 9·1% Summer 8·8%
Biomphalaria	Winter (May to Sept.) 1·2% Summer (Oct. to Apr.) 3·2%	Winter ? Summer ?	Winter 0 Summer 1·3%
Bilharzia intensity			
S. haematobium	High. Total 66%. Over 80% age-groups 5-19	Moderate. Total 50%. Over 80%, age-groups 10-19	High. Total 65%. Over 70%, age-groups 5-29
S. mansoni	High. Total 68%. Over 70%, age-groups 0-4, 10-19, 30-39	Moderate. Total 29%. Over 40%, age-groups 10-14, 20-29	Moderate. Total 33%. Over 40%, age-groups 15-49
Chances of re-infection			
S. haematobium	High throughout the year	?	High throughout the year
S. mansoni	High during summer. Moderate during winter	?	Low during winter

* Based on general observations, rainfall, volume of water and habits of Natives; not on snail infectivity rates

We wish to express our sincere gratitude to the technical staff attached to the Department of Health at Tzaneen and Nelspruit for their assistance in compiling this report.

REFERENCES

1. Official Records at Tzaneen.
2. De Meillon, B., Stoffberg, N. and Lurie, H. I. (1953): S. Afr. Med. J., **27,** 257.
3. Kisner, C. D., Stoffberg, N. and de Meillon, B. (1953): *Ibid.*, **27,** 357.
4. Annecke, S. and Peacock, P. N. B. (1951): *Ibid.*, **25,** 676 and 689.
5. Cowper, S. G. (1953): Trans. Roy. Soc. Trop. Med. Hyg., **47,** 564.
6. Adams, A. R. D. (1934 and 1935): Ann. Trop. Med. Parasit., **28,** 195 and **29,** 255.
7. Pitchford, R. J. (1953): Publ. Hlth. (Johannesburg), **17,** 325.
8. Hunter, G. W., Freytag, R. E. and Ritchie, L. S. (1952): J. Parasit., **38,** 509.
9. Personal Communications.
10. Wright, W. H. (1951): Parasitology, **37,** 1.
11. Gelfand, M. and Ross, W. F. (1953): Trans. Roy. Soc. Trop. Med. Hyg., **47,** 218.

MEETING OF THE FEDERAL COUNCIL IN CAPE TOWN

The half-yearly meeting of the Federal Council was held at Red Cross House, Riebeeck Street, Cape Town, on 16, 17 and 18 March 1955. The meeting extended over 6 morning and afternoon sessions and lasted about 30 hours. Dr. A. W. S. Sichel, Chairman of Federal Council, presided and there were present 49 members, including Dr. L. E. Lane (President of the Association), Dr. J. H. Struthers (President-Elect and Vice-Chairman of Federal Council) and Dr. J. S. du Toit (Hon. Treasurer). Four proxies were presented.

Questionnaire on Registration of Specialists

Federal Council at the last meeting had postponed consideration of the Medical Council's request for the Association's views on the interpretation of the 'referendum' and the steps that should be taken, until after a further analysis had been made of the replies to the questionnaire. At the present meeting Dr. J. P. de Villiers, on behalf of the scrutineers presented the further analysis they had made (published in the *Journal* of 12 March 1955, p. 263). Considerable debate ensued, during which different views were expressed on how the figures were to be interpreted.

On the motion of Dr. J. A. Currie, it was resolved to record that Federal Council's interpretation was that (*a*) a majority of voters favoured the retention of some sort of registration, (*b*) a majority favoured a register of consultants, (*c*) a majority favoured statutory registration (as opposed to voluntary), and (*d*) an overwhelming majority held that domiciliary visits should not be made by specialists or consultants except in consultation or in case of emergency.

It was further decided to send this interpretation, together with the scrutineers' figures, to the Minister of Health and to the Medical and Dental Council.

CONTRACT PRACTICE

The Escom (Natal Central Undertaking) Medical Benefit Society, Polliack Group Medical Aid Society, and the S.A. Liberal In-

surance Co. Ltd. Medical Aid Fund (conditionally), were added to the list of approved societies; and it was noted that two medical aid societies were now off the list, having gone out of operation, viz. East London Municipal Employees' and J. H. Vivian and Co. Ltd.

Income of Members of Medical Aid Societies. In view of the recent consolidation of cost-of-living allowance with basic salary in certain occupations, it was decided to increase the limit for average income from £700 p.a. to £850 *where there has been consolidation of c.o.l. allowance.* It was also decided that the £2,500 p.a. income ceiling for members should not be interpreted any longer as referring to basic income (i.e. excluding c.o.l. allowance), but to gross income.

Medical Aid Society Tariff of Fees. Certain fees came under discussion and it was decided to ask medical aid societies to agree to the following (*inter alia*): (*a*) an increase of 2s. 6d. in the fee for general practitioners' visits and consultations (to 17s. 6d. and 15s. in Johannesburg, and 15s. and 12s. 6d. elsewhere); (*b*) that the listed fees for dental anaesthetics should not be subject to reduction when they are administered by general practitioners.

A proposal that the minimum anaesthetic fee for intracardiac operations should be 15 guineas was referred back for discussion with the anaesthetists and thoracic surgeons.

Unregistered Practitioners. A rule was adopted that in future no benefit or medical aid society which permits payment for services to unregistered practitioners or auxiliaries should be granted approval. It was also decided to seek a ruling on the subject from the Medical Council before considering the application of this rule to societies at present approved.

Refraction Tests. Certain medical aid societies do not include refraction examinations in their benefits, and it was resolved to inform societies that when a patient is referred by a general practitioner to an ophthalmologist the account of the ophthalmologist should be honoured by the society.

NATIONAL MEDICAL AID SOCIETY OF SOUTH AFRICA

Federal Council had not yet been assured that the Society was effectively controlling the average income of its members and was awaiting information on that point. Council thereupon resolved 'that Federal Council informs the National Medical Aid Society of its inability to continue discussions with the Society in regard to any of the matters previously raised unless the Society is prepared to furnish satisfactory evidence of the income of its members at six-monthly intervals. Inability to give this undertaking would compel the Medical Association to withdraw its recognition of the Society'.

Onderling Mediese Hulpvereniging van 1954. An application for approval was received from this new society, which is a medical aid society similar to the National Medical Aid Society, with head office in Johannesburg, not confined to any one firm, company, etc. and providing for the incorporation of firms as well as individuals. Consideration of the application was deferred to a future meeting.

Vanderbijlpark Medical Benefit Fund. Debate took place on the employment of full-time medical officers by this society. Many members advocated drastic action, but it was decided not to take action at present. Whether the Association membership of a practitioner who had accepted a full-time appointment in spite of non-approval by the Association should be terminated came under consideration; the Secretary explained that the bylaws provided that it was necessary for action to be instituted by the Branch concerned after an enquiry had been held. It was unanimously decided to defer the question until the next meeting of the Federal Council.

In reference to the arrangement for payment of fees according to the Medical Aid Society Tariff less a discount of 10%, it had now been agreed that fees of 2 guineas or less should not be subject to the discount (except for the Departments of Defence, Prisons, and Pensions, which were still awaiting Treasury approval). This basis of payment had now been extended to the treatment of prisoners for the Government.

A tariff of fees was adopted by Federal Council for members of Medical Boards of the Pensions Department, viz. 2 guineas for original Medical Board reports and Medical re-Board reports, and 3 guineas for members of Medical Appeal Boards and Special Medical Boards. It was understood that the Commissioner of Pensions might accept this tariff.

PATHOLOGICAL SERVICES

A memorandum from the Pathologists' Group (4 January 1955) was considered setting out in detail the difficulties of private pathological practice, especially in the Transvaal, in the face of competition from the S.A. Institute for Medical Research and other public bodies. These bodies enjoyed advantages denied to private pathologists in the way of remission of excise duties on alcohol, and freedom from income tax. The Transvaal provincial administration was negotiating an arrangement with the Institute under which the exclusion of private pathologists from hospitals would be extended. Moreover private hospitals and other bodies were being served by the Institute. Certain two private hospitals received a percentage of the fees they collected for services rendered to their patients by the Institute. The Medical Council was unable to deal with the ethical implications because it could not take disciplinary action against an institution.

In the memorandum the Pathologists' Group recommended a series of measures to remedy these conditions. Federal Council debated the matter at considerable length and resolved to accept the report and note the recommendations, referring the latter to the Parliamentary Committee for consideration.

FARMING OUT

A meeting convened by the Medical and Dental Council was being held in Cape Town on 19 March 'to consider, in relation to medical ethics, the subject of the provision of medical and dental services by institutions, the harmonizing of the interests of the public with the interests of institutional and private practice . . . .'. This meeting would also consider the Medical and Dental Council's expressed opinion that professional employees of such institutions should be responsible to the Council for any conduct of the institution which, if attributed to a doctor or dentist, would constitute improper or disgraceful conduct in a professional respect. Each of the following bodies had been invited to be represented: (1) The S.A. Medical and Dental Council, (2) the Universities with medical or dental faculties, (3) the S.A. Institute for Medical Research, (4) the Union Health Department, (5) the Medical Directors of Hospitals of the 4 Provinces, (6) the Medical Association of S.A., and (7) the Dental Association of S.A. The Medical Association's representatives were Dr. M. Shapiro and Dr. Struthers.

An item which Federal Council decided to submit to this conference was the growing practice by which hospitals or nursing homes (particularly tuberculosis hospitals) were maintained by private companies which employed and paid salaries to the medical staff and received the fees paid by the patients. This form of farming-out was also practised by SANTA. In some of these cases the fees were paid by the Government and local authorities. The opinion was expressed that this practice was a grave threat to the medical profession. It obtained in 5 hospitals at present, soon would in 7, and it was to be expected in many more in the near future unless steps were taken to prevent it.

Another matter for submission to the conference was the charging of fees by provincial hospitals for professional services rendered by radiologists, pathologists and physical medicine specialists.

Private Consulting Rooms in Nursing Homes. At the request of the Medical Council consideration was given to the fact that certain medical practitioners had consulting rooms in nursing homes used by other practitioners' patients. The question had been referred to Branches, and while some had expressed the opinion that the practice was not unethical other Branches had not yet replied. The conclusion of Federal Council was that in general the practice was undesirable.

WORKMEN'S COMPENSATION ACT

It was reported that, whereas the Workmen's Compensation Commissioner had previously refused to pay accounts to general practitioners for X-ray examinations carried out by themselves on their own patients, the Commissioner after a discussion with Association representatives had now agreed to pay such accounts provided they were endorsed, 'It was in the best interests of the workman that he should have been X-rayed at the time'. Several

members objected to this requirement, but on a vote the terms offered by the Commissioner were accepted.

Free Choice of Doctor. Attention was drawn to the arrangement that was made in various parts of the country by which workmen injured on duty were directed to particular practitioners, who thereby obtained an undue proportion of such practice. Members said that in some cases this was done on such a scale as to be scandalous. In discussion the opinion was freely expressed that the injured workman ought to have and exercise a free choice of doctor, and it was decided to seek a meeting on the subject with the Workmen's Compensation Commissioner and the Federated Chamber of Industries.

An analagous instance that Federal Council discussed was the appointment of a factory medical officer whose duties were to include the treatment of workpeople injured on duty. The Natal provincial administration also, it was stated, made it incumbent on their staff to attend W.C.A. cases. It was decided to ask the Medical and Dental Council to incorporate a definition of 'farming out' in their ethical rules.

TREASURER'S REPORT

The audited Income and Expenditure Account of the Association for the year 1954, which was adopted, showed a surplus of income over expenditure of £5,205, which was added to the Association's accumulated funds to make up for the deficits of previous years.

ADDITIONS TO MEDICAL HOUSE, CAPE TOWN

On the recommendation of the Head Office and Journal Committee Federal Council authorized the addition of 4 storeys to the existing 3-storey building at an estimated cost of £25,000.

The floor space of the present building, which originally cost £9,000 and has recently been valued at £30,000, is 2,000 sq. ft. per storey, of which 1,284 sq. ft. is available as office space; and the space in the new floors would be the same.

The existing building is insufficient for the Association's staff, and the present intention is to use one of the new floors and to let the other three. Space in a new building near by has recently been let at 1s. 3d. per sq. ft. for the upper floors.

Medical House is owned by Medical House (Pty.) Ltd., of which the 5,100 £1 shares are held half by the Association and half by the Cape Western Branch (£3,500 is held as a mortgage bond by the Benevolent Fund). The money for the proposed building work is to be raised on mortgage by Medical House (Pty.) Ltd., and the Cape Western Branch has indicated that it is willing for its capital share in the building to remain so long as the Association Head Office occupies the building.

The decision of Federal Council followed a long debate, in which some members expressed the fear that the enlargement of the building might make it more difficult to change the locale of Head Office if this should be decided on at some future time. The resolution as carried contained a proviso that it was understood that it would not influence the ultimate decision on the locale of Head Office.

VARIOUS

Insurance against Cost of Legal Defence in Criminal Charges. Further consideration was given to this matter in the light of the Atlas Insurance Company's proposals. Various views were expressed, some members objecting to the principle of such insurance and others making comparisons with the terms offered by the Medical Defence Union and the Medical Protection Society. It was decided to obtain details from these companies for consideration at the next meeting.

Shortage of Interns. When compulsory internship was introduced the number of students graduating was abnormally high owing to temporary post-war conditions, and there was difficulty in obtaining intern positions for them all. Now that the number of graduands had returned to normal there were more posts available than interns to fill them, and certain hospitals were unable to obtain the interns they needed. In the course of debate the relative advantage to interns of posts in the teaching hospitals, the larger non-teaching hospitals and the small hospitals in town and country were discussed. It was decided to appoint a small committee to consider and report on internships and medical education. Drs. Cole Rous (convener), McMurray and Lee, of Cape Town, were appointed, with corresponding members from other Branches.

Association Booklet on Ethics. It was announced that the Afrikaans version was being printed and would shortly be circulated to all members.

New Division. The constitution of a new division, the Orange Free State Goldfields Division, was approved.

Empire Medical Advisory Bureau. It was resolved that the thanks of the Association be conveyed to the British Medical Association for the assistance rendered by the Empire Medical Advisory Bureau to students from South Africa.

Swedish Government Health Scheme. In connection with this scheme the Swedish Consul in Johannesburg had approached the Southern Transvaal Branch with regard to the establishment of a medical scheme for Swedish residents in South Africa. Federal Council resolved that Swedish residents should be charged private fees.

Medical Congress. The holding of the Congress in Durban, which will be the next Congress following the Congress to be held in Pretoria in October 1955, was fixed for 1957.

Honours. It was decided to make a posthumous award of the gold medal of the Association to the late Dr. Karl Bremer, formerly Minister of Health, and an ex-President of the South African Medical and Dental Association, and to confer the bronze medal on Prof. S. F. Oosthuizen and Prof. L. J. te Groen, President and Treasurer of the South African Medical and Dental Council, and on Dr. D. P. Marais for his services to medicine, especially in the sphere of tuberculosis; and honorary membership of the Association on Miss C. A. Nothard, President of the South African Nursing Council and Dr. R. V. Bird, D.D.S., Vice-President of the South African Medical and Dental Council. Emeritus membership of the Association was conferred on Dr. J. H. Harvey Pirie, a past-President of the Association. The presentation of these awards will take place at the Medical Congress at Pretoria in October.

Next Meeting. The next meeting of Federal Council is to be held at the Hotel Assembly, Pretoria, on 13-15 October 1955.

MEMBERS OF THE MEDICAL COUNCIL ENTERTAINED AT DINNER

The President of the Medical Association of South Africa (Dr. L. E. Lane) and the Chairman of Federal Council (Dr. A. W. S. Sichel) invited the members of the South African Medical and Dental Council to meet the members of Federal Council at dinner on 18 March. The dinner took place at the Civil Service Club, Cape Town. Dr. Lane presided over a party of 56.

The President welcomed the guests and called on Dr. Sichel to propose the health of the Medical and Dental Council. In doing so Dr. Sichel stressed the excellent relations now obtaining between the Council and the Association, and announced the honours that Federal Council had decided to confer on Professor Oosthuizen, Miss Nothard, Dr. Bird and Professor te Groen, as well as, posthumously, on the late Dr. Karl Bremer.

In reply Professor S. F. Oosthuizen referred to the value of friendly cooperation between the two bodies, and expressed his appreciation of the honour the Association had done him. He proposed the health of the Association, which was replied to by Dr. Harvey Pirie. Miss Nothard, Dr. Bird and Professor te Groen also thanked the Association.

ASSOCIATION NEWS : VERENIGINGSNUUS

THE PRESENT POSITION AND FUTURE OF THE GENERAL PRACTITIONER IN SOUTH AFRICA

VALEDICTORY ADDRESS BY DR. H. P. E. MARAIS AT ANNUAL GENERAL MEETING OF BORDER BRANCH

The following valedictory address was delivered by Dr. H. P. E. Marais at the Annual General Meeting of the Border Branch held in East London on 19 February 1955. His subject was 'The Present Position and the Future of the General Practitioner in South Africa'.

In medical circles all over the world the General Practitioner is referred to as 'the backbone of the profession'. South Africa, though vast in extent, is small in population which, in the 'platteland', is scattered over wide areas. In our extensive country areas, with very few exceptions, the General Practitioners comprise the whole force of doctors serving the population. All patients requiring specialist attention in the country cannot possibly avail themselves of such services for reasons of topography and/or economic reasons, the latter applying especially to the coloured sections of the community and underprivileged Europeans of our population. We know that these numbers are large.

Even if patients falling under this group are sent to the larger centres for treatment, one often finds the whole set-up unsatisfactory, for the following reasons:

(1) Often such patients lose so much pay and their employers, if any, so many man-hours, that they are obviously reluctant to go because of socio-economic upheaval in their small sphere of life.

(2) The question of transport to and fro: this costs the Government for these *pro deo* cases, considerable sums of money.

(3) When they reach the larger centres and retention in hospital is required, no bed is available then—or for some time thence—as these hospitals have long waiting lists, and are unable to cope with the numbers in their own towns or cities.

In these cases the General Practitioner must, of necessity, in the performance of all his multifarious duties, offer and execute the best treatment at his disposal—very often lacking in equipment and drugs (these items often being very costly and beyond his reach—especially when he is well aware of the fact that he cannot expect remuneration in return). But then—a man who does not do more work than he is being paid for is not worth what he gets. Furthermore—as District Surgeon and/or M.O.H. in his small village or town, with or without a pharmacist, he is often not supplied with suitable equipment or drugs to treat these cases.

The above applies more particularly to the outlying villages and smaller towns with a European population, say, varying from 500 to 2,000. It is here, particularly, that the practitioner serves not only as medical adviser, but he must be guide, philosopher and friend to all members of families. This demands an intimate knowledge of human nature, psychology, and the impact of disease on human nature and relationships. He must play an important role in public and social life. This all demands wide education, character and experience which cannot all be included in a University curriculum extending over 6 years.

COMPETITION AND CO-OPERATION

Now we come to the larger-size towns with a European population of, say, up to 8,000 or 12,000. Here more favourable circumstances prevail as far as medical, social and other services are concerned. Here we invariably find a hospital and private nursing home and/or maternity home. These facilities make practice in these centres attractive and well worth while. The patient-doctor relationship here is still well maintained and this has its many rewards, and results in a feeling of satisfaction that you are playing a worth-while part in community life. Most, if not all, of the practitioners here are on the honorary staff of the hospital.

It is here, in my opinion, where the standard of General Practice must, of necessity, be high, because one has the facilities and the privileges of hospitalizing your cases and thus following them up and seeing them through a medical or surgical crisis—whichever the case may be. There is, quite naturally, a spirit of healthy competition amongst practitioners, and usually—and also very fortunately for all concerned—a spirit of friendly co-operation. This all stimulates interest, stimulates reading and a desire for postgraduate study—indeed, in towns of this size, one nowadays oftens finds medicos with higher qualifications or certainly some who, although they do not possess higher diplomas or degrees, have done postgraduate work in either medicine or surgery.

It is also in these towns that one finds groups or 'combines' of practitioners where several members have done postgraduate work in some branch of medicine or surgery, and therefore offer their patients the advantages of specialized knowledge and treatment. I shall refer to the latter again later on. In these places specialist services are gradually becoming available to the public, on the spot, by organized visits by specialists from larger neighbouring centres, which is an excellent arrangement for all concerned. This, in addition to offering the public amenities for specialist attention, keeps the General Practitioner 'up to date' which is all to the good, and acts as a form of postgraduate training for him.

We now come to the general practitioner in the larger towns and cities. Here there are large numbers of them of whom only a small proportion find it possible to gain access for themselves and their cases to hospitals. They do, of course, have private nursing homes at their disposal. The larger Provincial hospitals in some Provinces, are gradually being taken over and administered by full-time specialist staff or have a panel of part-time specialists plus, of course, the usual resident medical officers—mostly of more junior status. The teaching hospitals, of course, are now predominantly staffed by specialist full-time personnel on a salaried basis.

It follows, therefore, that most of the general practitioners here are engaged in practices which consist, predominantly, of out-patient services and, of course, visits to their patients at their homes. Most of their cases, paying or non-paying, which require hospitalization are passed on to specialists, and large numbers are referred to the out-patient departments of either a teaching or other hospital for admission, and they lose touch with them.

In these larger centres paying patients have direct access to specialists of whom there are many, and the numbers who proceed direct to specialists for advice and treatment, without first consulting a General Practitioner, must be very large. One often finds that such a case is referred from one to the other specialist, down the line, because there is something in the symptomatology which is 'outside the particular specialist's province'. This might prove a most costly undertaking for the patient; not infrequently the ailment is something which could have been put right, at a nominal fee, by their own family doctor.

It is for these men and those general practitioners in the small outlying country towns first mentioned who battle along without the amenities and facilities of modern medical practice, towards whom one feels sympathetic and yet whom we admire for the way they are conducting their practices under adverse and difficult circumstances. So often they are the subjects of harsh and adverse criticism from higher levels which is, not infrequently, grossly unfair. One often feels that the critic in question has very little, if any, conception of the conditions under which such a practitioner has to work and administer treatment. Under such circumstances, if mistakes are committed, they are frequently pardonable.

We do, of course, admit that we, like any other profession, have the proverbial 'black sheep' in our ranks—but those we do not seek to enlarge on at present.

In the cities, also, one finds practitioners organizing themselves into 'groups' as previously outlined—an organization which seems to work very well.

SOME SUGGESTIONS

What can we offer as suggestions to improve the position of the General Practitioner who, very fortunately, in South Africa, still occupies an honoured place in the community and who is such an essential part of the community, wherever that may be—but more particularly in the country areas?

(1) Firstly, in the educational sphere—at our teaching hospitals:

The subject of medicine has become so wide, vast and so specialized, and the demands of general practice too wide to enable medical students to be trained, during their undergraduate curriculum, in all the experiences they are likely to meet as general practitioners. This very fact, quite conceivably, discourages many a young graduate from entering general practice, and turns his mind to specialization.

Prof. Elliott, the Professor of Medicine at the Rand University, wrote an excellent article in the *Journal* of 5 February last (p. 134) on this aspect of medical training. He described the Health-centre, 'apprenticeship' and 'attachment' schemes, whereby senior students are given the opportunity of getting into closer personal contact with cases at out-patient clinics and domiciliary services by doing this work themselves, under supervision, or in the company of a General Practitioner who takes them with him on his 'daily rounds'. This I think, is an excellent scheme and should be exploited to the full. Practitioners, I am sure, will co-operate very willingly in such an undertaking.

Compulsory internship for one year, apart from being essential, has done a lot to help in this direction. I feel that the young graduate, after qualifying, should be encouraged to proceed to a non-teaching hospital, of which there are many, for internship and other more senior residential M.O. appointments because, at these hospitals, he will gain far more experience of a general and practical nature which will prepare him more suitably for general practice. Most appointments, if not all, at teaching hospitals should be reserved for those who want to specialize. There is no doubt that any specialist who has first had experience of general practice—and the longer the better—will be a far better and more successful specialist than his colleague who has never been in general practice.

Until fairly recently our medical schools have had to train only General Practitioners—and they have done it well. They are now still somewhat in the transition stage where, in addition, they are training specialists and research workers. Some 'teething troubles' are bound to exist during this stage. I am confident that, just as they have so admirably succeeded in training undergraduates in the past, so they will also succeed in training men for higher degrees and diplomas. The Specialists who are being to-day, and have for some time already been, passed out from our training schools, are first-class men and need not stand back for any other in their category. This I say without fear of contradiction.

MORE HOSPITALS IN RURAL AREAS

(2) Still more hospitals should be provided in the rural areas—and also, of course, in large centres. It is gratifying to see that, although they are always complaining that there are no funds available, the Provincial Administration is gradually building more hospitals in the smaller centres. As Dr. Schaffer has put it: 'It is considered essential that every doctor should be associated with the work of a hospital.' The very necessary specialist services will gradually come to these places if hospitals are provided.

(3) Facilities for postgraduate training and refresher courses should be developed and expanded so that the General Practitioner could, from time to time, attend these courses, which are of inestimable value to him and supply refreshed interest in his work and association with his colleagues, as well as additional knowledge of the rapid progress in the medical field.

(4) Although his hours are long and full, the general practitioner must read more and take a more active interest in the work of his Medical Association—both as regards matters of policy and also the clinical aspects. He should make every attempt to attend these meetings—both to learn and also to come into contact with his colleagues.

(5) What we want in the 'platteland'—outside our cities—is a strong force of well-trained, well-equipped General Practitioners, for whom a well-organized system of postgraduate training and refresher courses must be organized by our training schools and other larger hospitals.

In such a rapidly developing and progressing country as ours, do we not require a system of energetic immigration to develop our natural resources, minerals, industries and agricultural potentialities to the full? This will supply more people, more funds, will result in better hospital facilities, and will supply more work for our ever-increasing numbers of doctors who will be working under better conditions and will consequently be more contented and happy.

But—this is bordering on politics—so I had better conclude. In conclusion—let us not forget, 'There is no field of practice as rewarding as General Practice well done.'

POLIOMYELITIS IN THE UNION

Following are the returns, supplied by the Union Department of Health, of cases notified under the Public Health Act as suffering from Poliomyelitis in the period 11 to 17 March 1955:

	European	*Non-European*
Transvaal:		
Johannesburg	4	2
Ermelo	1	
Pretoria	1	1
Ventersdorp (fatal)	1	
Krugersdorp (fatal)	1	1
Vereeniging	1	
Louis Trichardt	1	
Lydenburg District		1
Total for Transvaal	10	5
Cape Province:		
Cape Town Divisional Council		2
Cape Town Municipality		2
Williston	1	
Kokstad Divisional Council		1
Umtata District		1
East London		1
Kimberley	1	
Total for Cape Province	2	7
Natal:		
Durban	1	1
Umlazi Mission		1
Pietermaritzburg District		1
Port Shepstone		1
Umzimkulu		1
Ladysmith District		1
Pinetown		1
Total for Natal	1	7
Orange Free State:		
Bethlehem (Location)		1
Total for Orange Free State		1
TOTAL FOR THE UNION	**13**	**20**

Union Department of Health Bulletin. Report for the 7 days ended 17 March 1955:

Plague. Cape Province: No further cases have been reported from the Uitenhage district since the notification of 10 February, 1955. This area is now regarded as free from infection.

Smallpox: Nil.

Typhus Fever. Cape Province: No further cases have been reported from the Vryburg and Glen Grey districts since the notification of 10 February 1955. These areas are now regarded as free from infection. No further cases have been reported from the Idutywa district since the notification of 17 February 1955. This area is now regarded as free from infection.

PASSING EVENTS : IN DIE VERBYGAAN

Research Forum, Faculty of Medicine, University of Cape Town. The next meeting will be held in the large ground floor lecture theatre, Groote Schuur Hospital, on Wednesday, 13 April, at 12 noon. *Speakers:* Dr. P. Brain and Dr. O. E. Budtz Olsen. *Subject:* Abnormal haemoglobins.

All medical practitioners are invited to attend.

CORRESPONDENCE : BRIEWERUBRIEK

THE DOCTOR AS A CITIZEN

To the Editor: Permit me to comment on a recent leader of yours—*the Doctor as a Citizen.*[1]

Professional secrecy, doing our job of work, is our duty and calls for no special comment. Anyone who works honestly is a good citizen.

Collectively, we could be more than merely good citizens. We have become complacent about some of our great national problems and, beyond our own affairs, the Association is mute. As an Association we could make our voice heard and our arm felt.

Take for instance road accidents, the victims of which we became acquainted with on our first ward-rounds, and have been increasingly familiar with ever since. People are being killed and maimed daily. What was meant to be a means of transport, for business and pleasure, has become killer No. 1.

The staggering cost of all this unnecessary and preventable waste of life and limb is depleting our resources of man-power and money; loss of earning power of the disabled adds to the total cost. Morally, the effect of all this senseless loss is incalculable.

What have we done to put a stop to this?

It is evident to most that punishment for road offences is ridiculously lenient and inadequate, and that there is no deterrent to speak of.

Here we have a chance of being good citizens, by starting an immediate and vigorous campaign for drastic and summary punishment in connection with road offences.

G. Apostilides

Riversmead
Poizotsha
12 March 1955

1. Editorial (1955): S. Afr. Med. J., **29,** 145 (12 February).

FREQUENCIES OF ELECTRICAL APPARATUS

To the Editor: Since the publication of the Postmaster General's letter on 'Frequencies of Electrical Apparatus for Medical Purposes' in your issue of 19 March 1955 (page 287) we have been inundated with enquiries from medical practitioners regarding the types of apparatus which are affected by these new regulations.

The International Regulations, mentioned in the Postmaster-General's letter, lay down only the basic requirements and leave it to every individual country which has signed the agreement (International Tele-Communication Convention, Atlantic City, 1947) to formulate its own regulations.

The Postmaster-General has so far not given any indication of his intentions, but it seems likely that he will follow the example of the American Federal Communications Commission (F.C.C.), which was the first authority to lay down regulations and whose example has been followed by most countries.

The F.C.C. regulations exclude electro-surgical equipment such as surgical diathermy apparatus, the 'Hyfrecator' and similar units, which are used intermittently, but apply to any type of diathermy and short-wave diathermy apparatus used for therapeutic purposes.

Therapeutic apparatus have been allocated certain wave-lengths and must operate on these bands of frequencies within very narrow limits.

Equipment purchased by South African medical practitioners during the last few years will, in most cases, conform to the international standards. American equipment of the approved type is usually marked on the front or back panel as follows: 'F.C.C. Approval No. . . . . .'

Equipment not conforming to these standards will become illegal on 1 January 1957. The Postmaster-General mentions the possibility of conversion, but experience in the U.S.A. has shown that this is not an economical proposition. The conversion would mean complete rebuilding of the machine and then submitting it for approval or else using it in a completely shielded room, the cost of which would be prohibitive.

The problem of interference caused by diathermy equipment was first brought to the attention of the medical profession in 1939 at a meeting of the American Medical Association. No action was taken during the war, but in 1946 the matter was taken up again and an international agreement was reached in 1947. Whilst the new regulations may cause considerable hardship to many medical practitioners, it must be pointed out that diathermy apparatus can produce interference not only with broadcast and television but, much more important, with radio-controlled planes, in communication between planes and between air and ground, and in the actual landing of aircraft by electronic means.

H. J. Kretschmer
Medical Distributors

P.O. Box 3378
Johannesburg
23 March 1955

A VACANT MEDICAL OFFICER'S POST

To the Editor: The pioneer Health Centre of this country, situated in the Polela district, Natal, seems to be lacking in support from the medical fraternity, and it is rather disturbing and puzzling to us farmers of the area that such a seemingly fine institution should be unable to fill the vacant medical officers posts on its staff.

The success achieved by the staff of the Polela Health Centre seems to be dependent upon the integrated service it provides to the local Natives, in that it has gained the trust and respect of the community, and is now able to practice the curing of ills, whilst getting the people to realize the value of 'preventive medicine' (improving diet, encouraging immunization, encouragement of a healthier way of life) as against hospitalization when the illness is extremely severe.

This type of practice appears to include all modern medical teaching (as represented in the lay press) in that the concepts, ideas, stresses and way of life of the people are related to their ill-health.

This permits of a deeper understanding of the diseases of the people and accordingly a much better therapeutic approach.

To the layman, the facilities available seem to be of the best—good modern housing for the staff, with all conveniences including electricity, a fully trained nursing staff, a small laboratory with a trained laboratory technician, an X-ray unit, etc., seemingly everything to attract a practitioner. Despite this, and advertising by the Health Department, no candidates have been forthcoming.

It is my belief that many young doctors are unaware of the existence of this Centre and its suitability for the carrying out of an excellent medical practice.

Accordingly, I would be grateful if you could publish this letter for their benefit.

N. L. Alcock
President
Bulwer/Polela Farmers Association

P.B. Donnybrook
Natal
17 March 1955

LAURENCE-MOON-BIEDL-BARDET SYNDROME

To the Editor: I was very interested in a report of 4 cases of this syndrome by Drs. Wolff and Etzine, which appeared in the *Journal* of 19 March 1955.[1] They state that the first case to be reported from South Africa was by Kessel in 1952. I would like to draw their attention to 2 complete cases of this syndrome which I reported in the *South African Medical Journal* of 11 March 1939.[2]

J. Helman

4 Joubert Street
Off Voortrekker Road
Vasco, C.P.
21 March 1955

1. Wolff, J. E. and Etzine, S. (1955): S. Afr. Med. J., **29,** 280.
2. Helman, J. (1939): S. Afr. Med. J., **13,** 167.